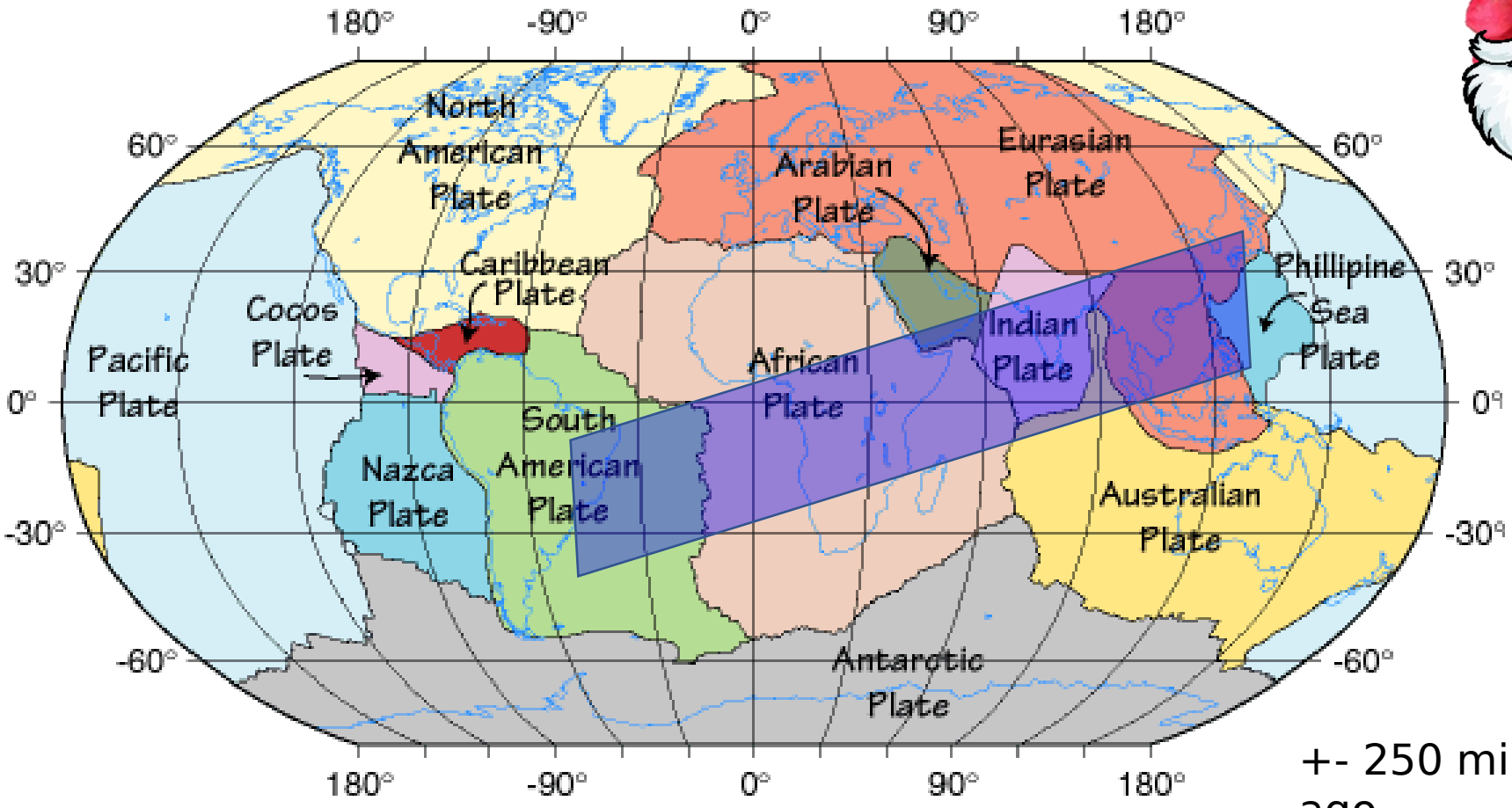
THE
BIG PICTURE

If you go back far enough there was a common ancestor *Begonia* that led us to today.

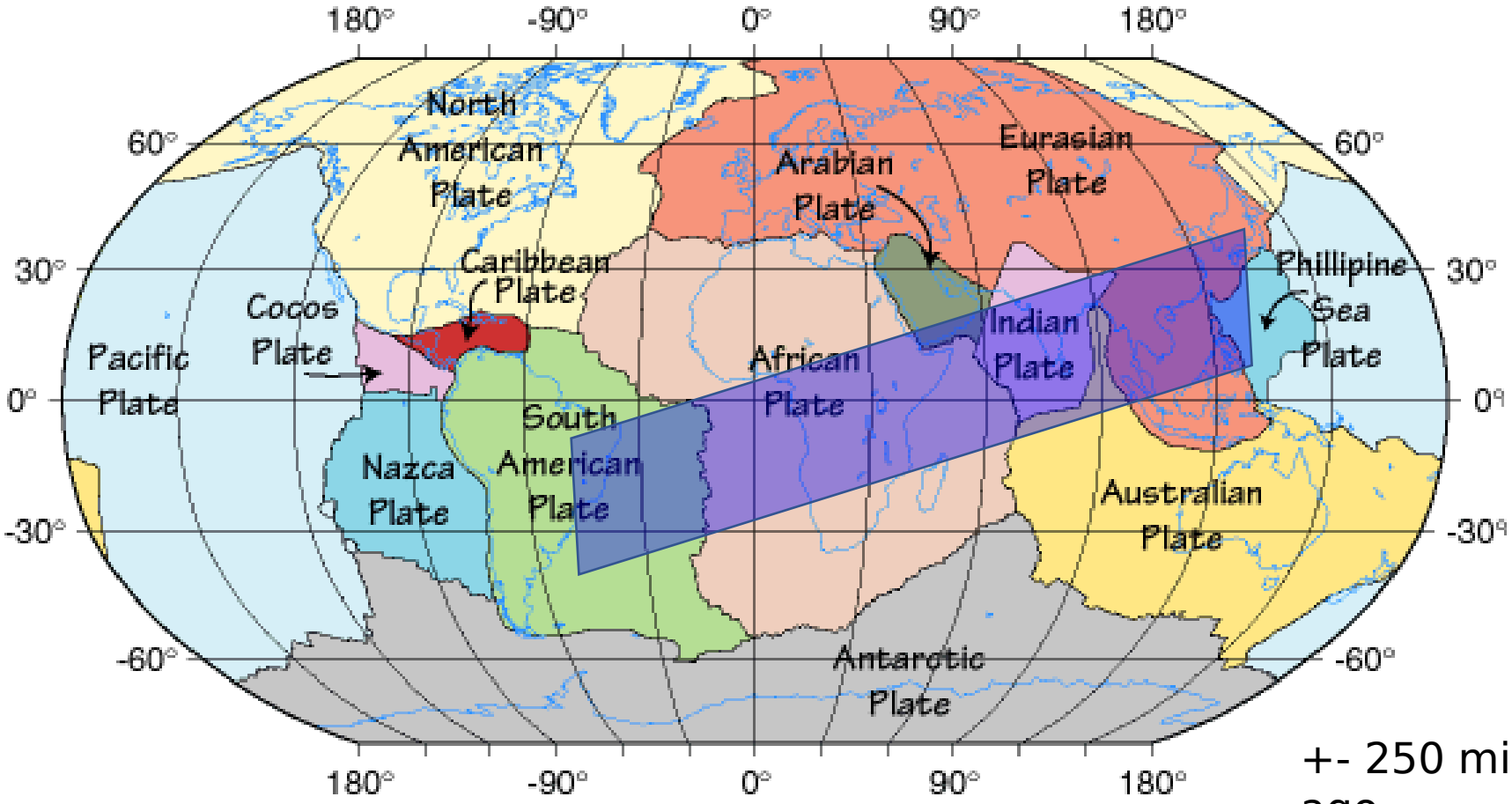
← Ancestor Begonia



+- 250 million years ago

It could happen...

But how did Begonias move all over and adapt?



+- 250 million years ago

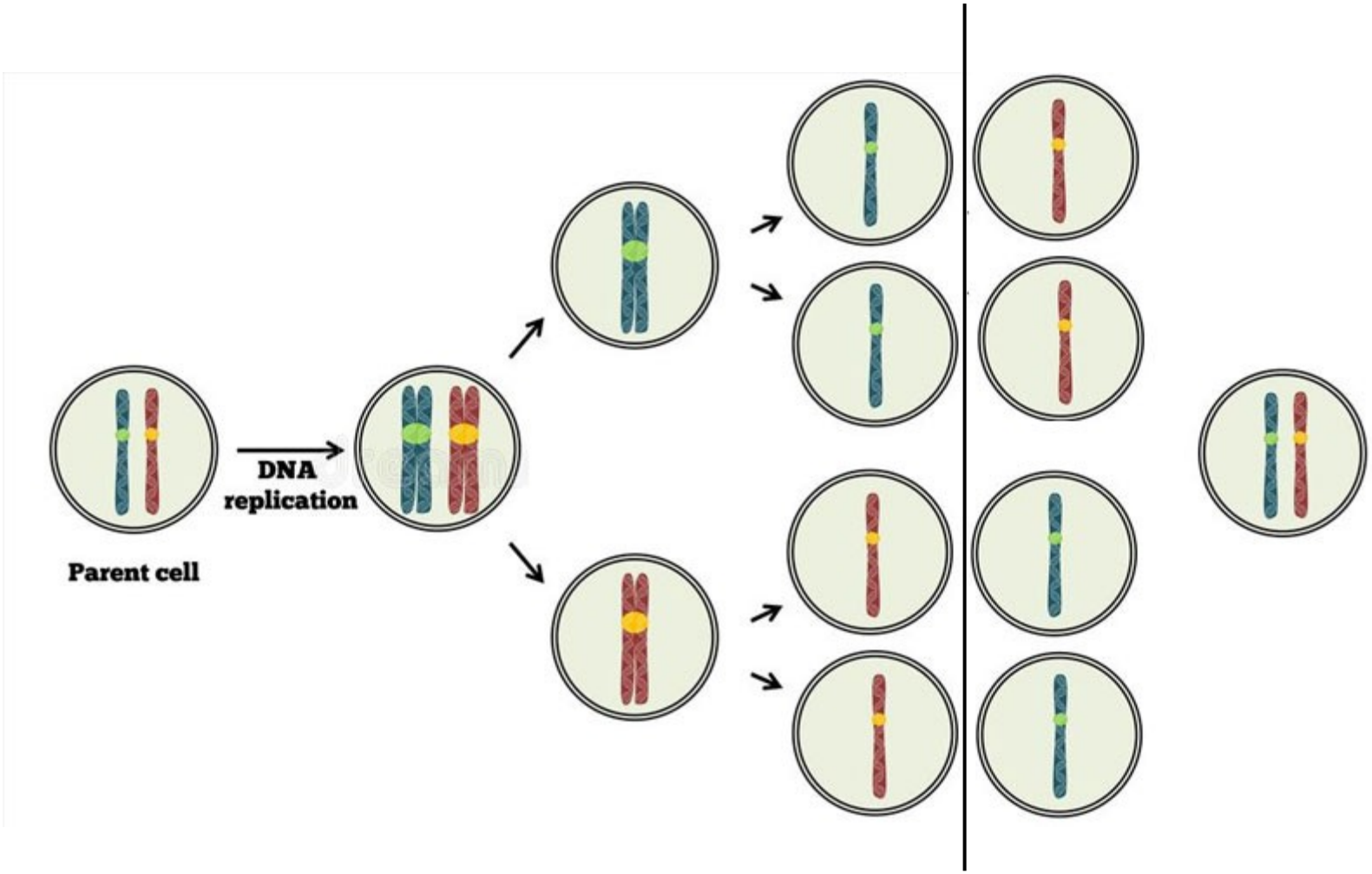
Begonia Colonization Strategies

LBH

Most of what I am now about to say, could be just wishful thinking, bad science, or bald-faced lies...

Begonias are a bit sloppy
(genetically speaking)

- Most plants produce matching sets of chromosomes to make procreation bland boring and reliable, and a bit inflexible.
- But Begonias…



Begonias are a bit sloppy

(genetically speaking)

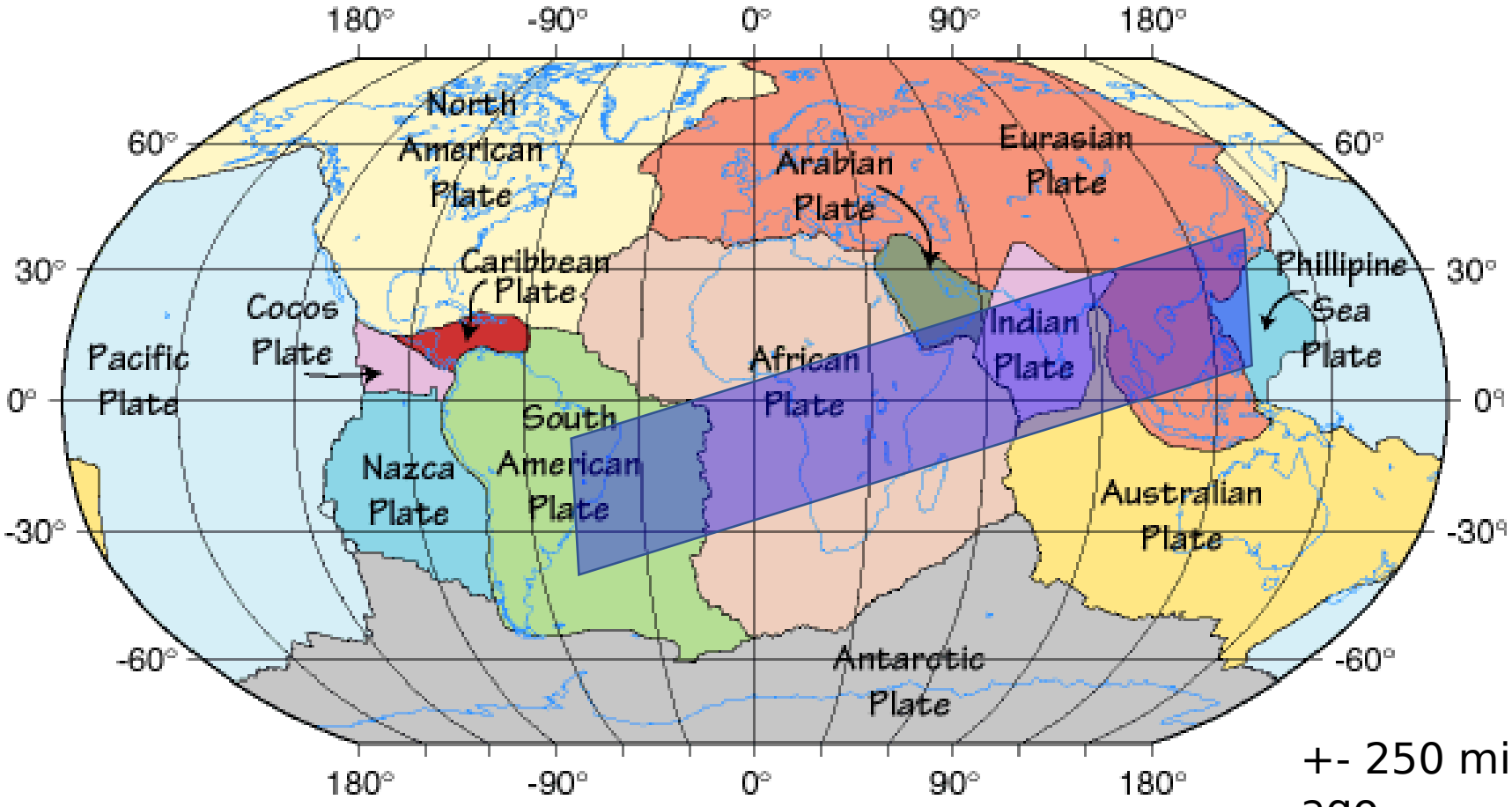
- Well, let’s just say they favor mutation over stagnation…
- Aneuploids, haploids, tetraploids, triploids.
- Spiral leaves, double flowers, color changes, crested blooms or leaves.

Begonias are a bit sloppy

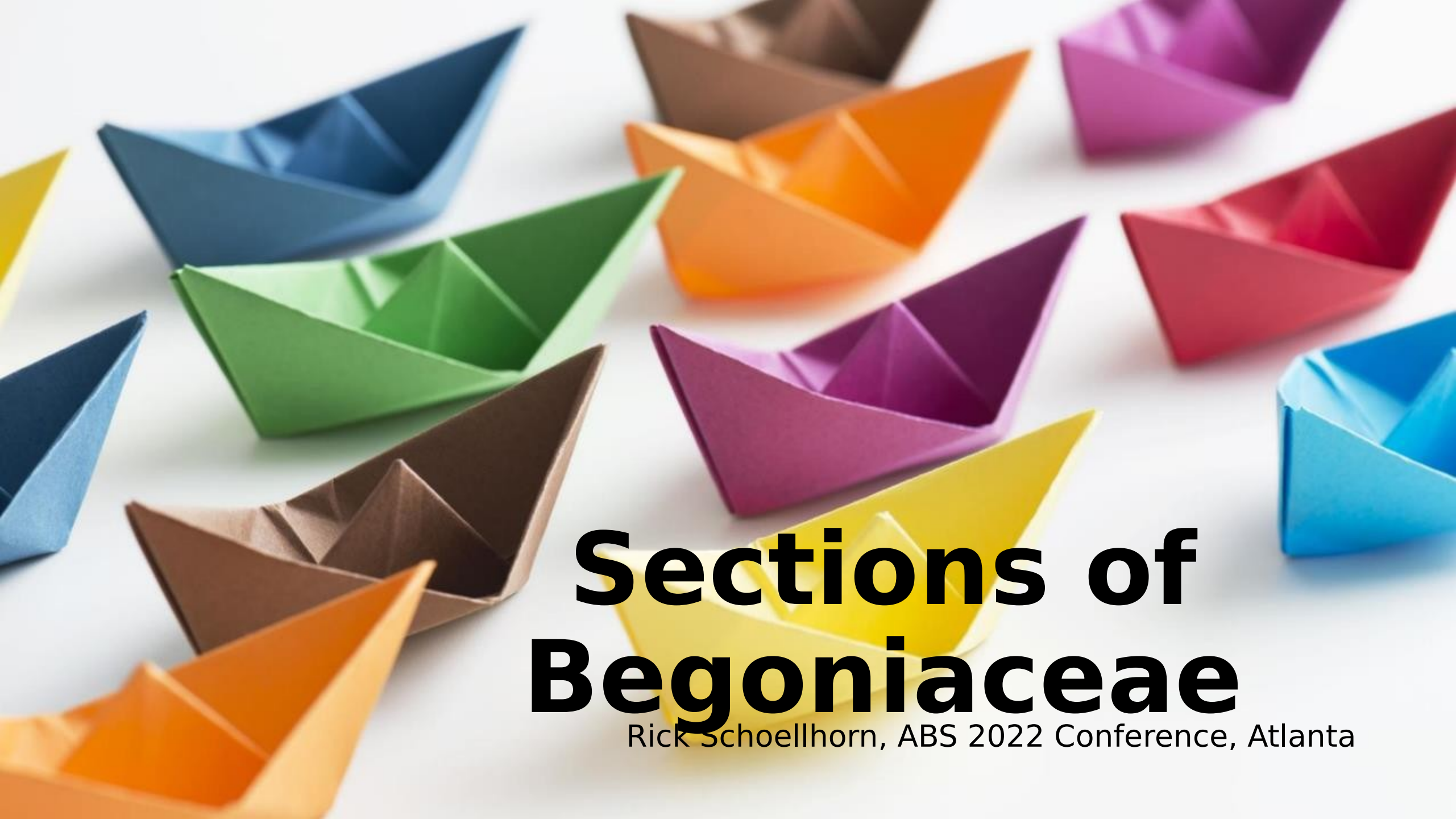
(genetically speaking)

- So even by the standard pollination process, Begonias are more likely to form natural hybrids, because the chromosome numbers they produce in ovary or pollen can be highly varied.
- Both by mutation and pollination Begonias can over time adapt to many environments.
- It allows for changing with the plant’s environment. More sun, less sun, more water, less water or warmer versus cooler temperatures.
  - Look at all the mutations in leaf surface to adapt to changing light conditions.
  - Or the different adaptations based on the continents that species arose from.
- So not only does this sloppiness provide an avenue for evolution it also allows for incredible hybrids to be made.

Even now, it is harder to cross plants that came from different continents. Simply because the genetics in each isolated location have drifted that far apart.



+- 250 million years ago

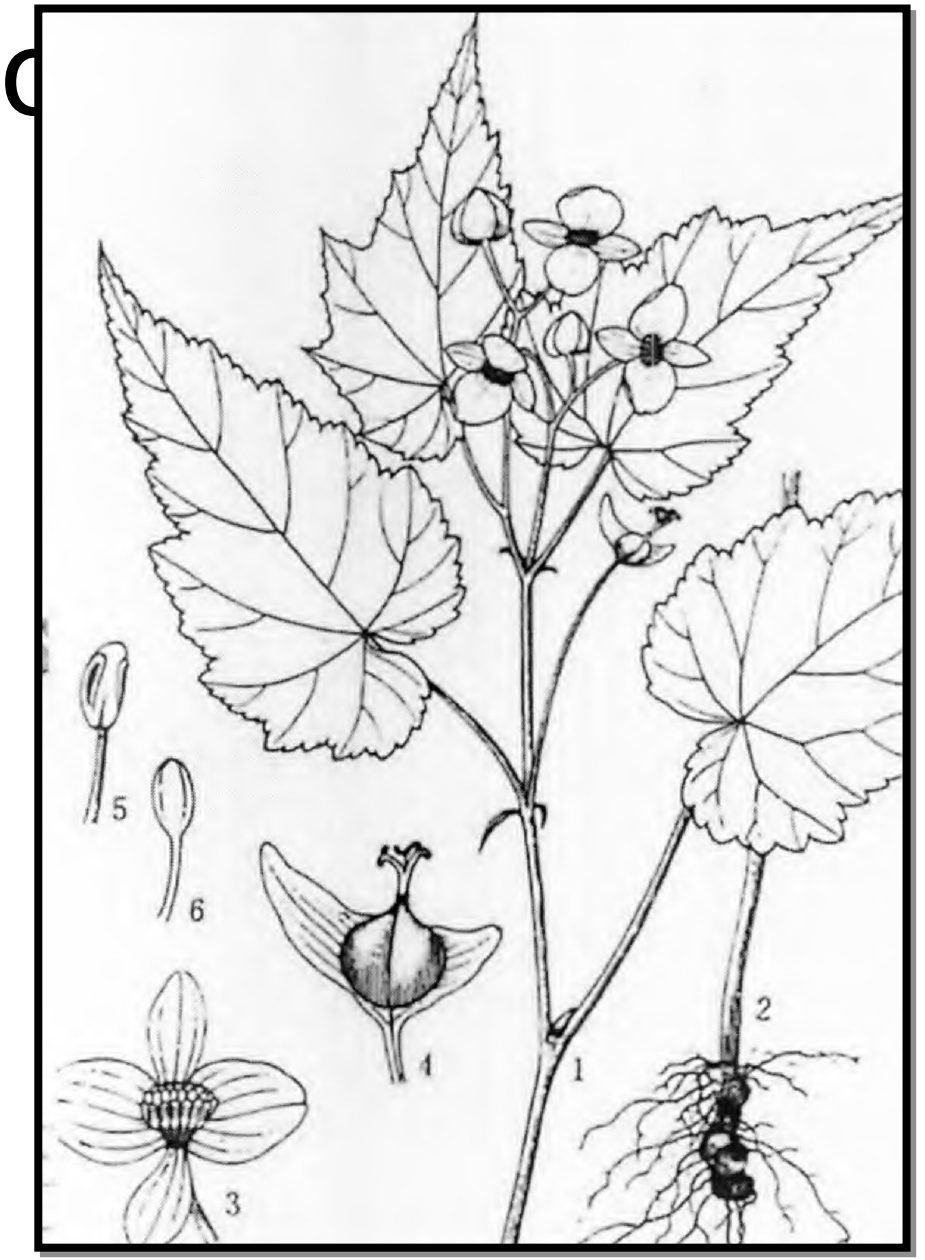


Sections of Begoniaceae

Rick Schoellhorn, ABS 2022 Conference, Atlanta

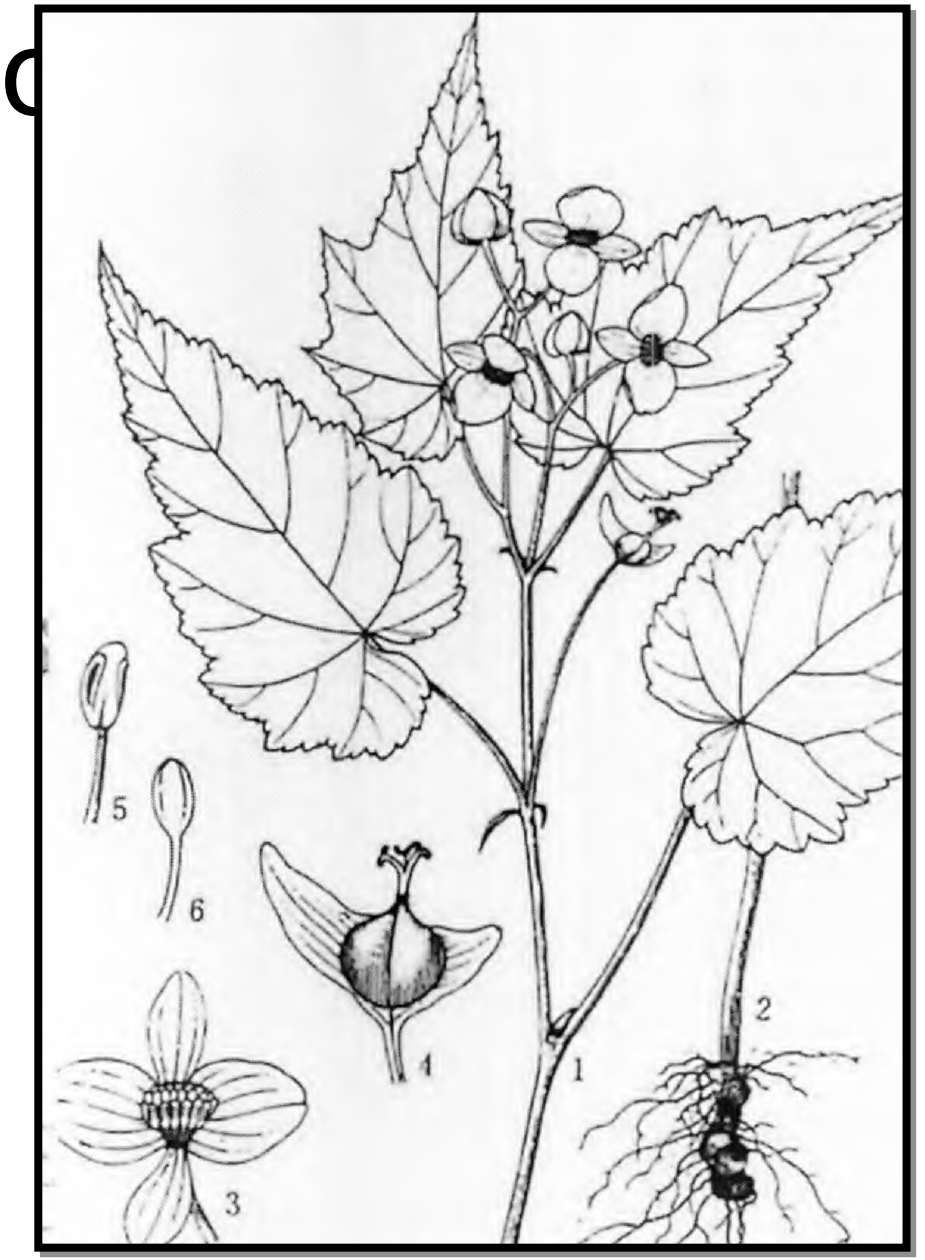
Nomenclature is based o
plant taxonomy.

- Which started out as the visual analysis of plant characteristics.



Nomenclature is based o plant taxonomy.

- Which started out as the visual analysis of plant characteristics.
- Which then expanded into describing all the different organs of the plant and their characteristics.
  - These words all describe different kinds of hairiness - **Arachnoid**, Barbellate, **Bearded**, Bristly, **Canescent**, Ciliate, **Floccose**, Glandular, **Hirsute**, Hispid, **Hoary**, Lanate, **Pilose**, Puberulent, **Pubescent**, Scabrous, **Sericeous**, Stellate, **Strigose**, Tomentose, **Villous**, and Woolly.

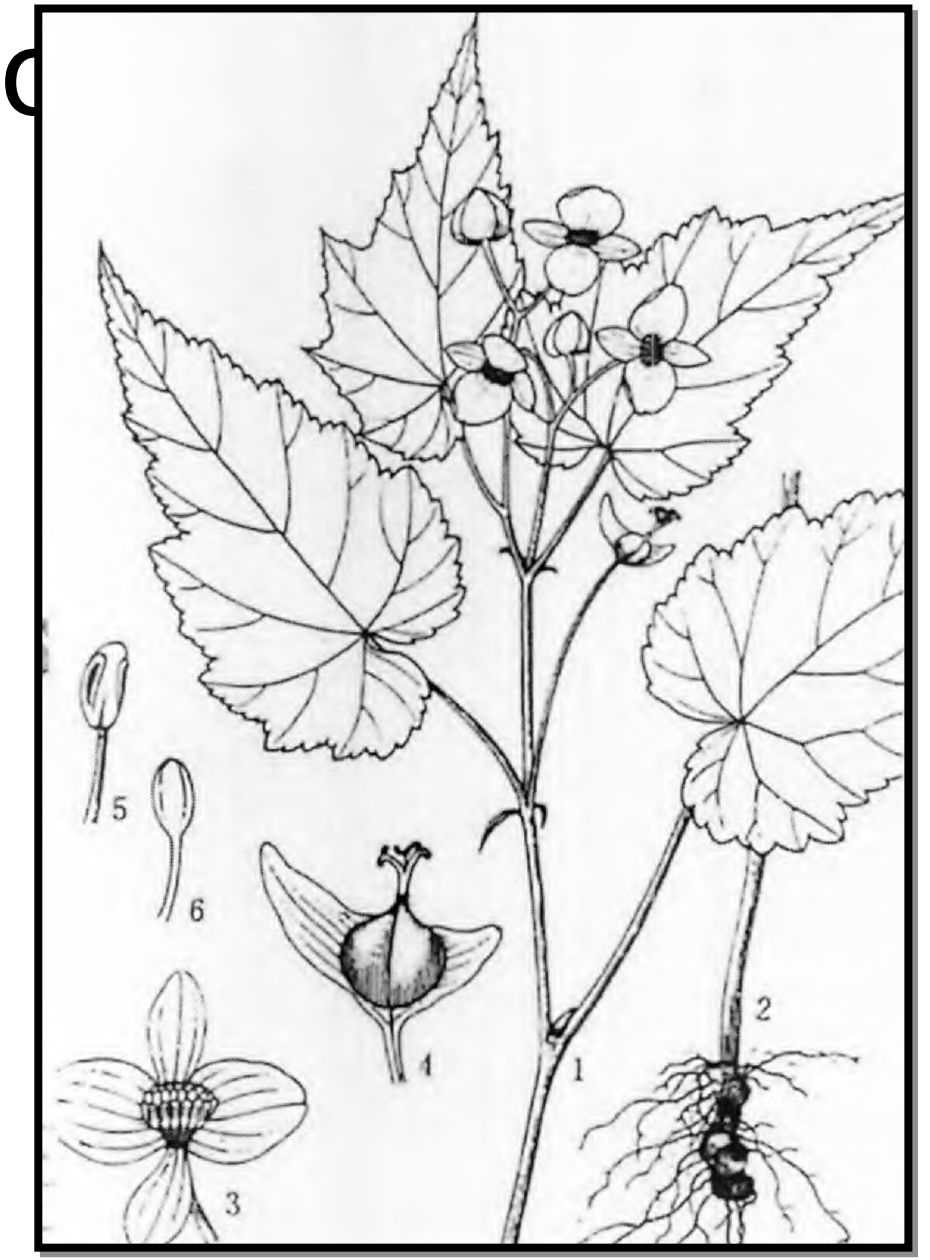


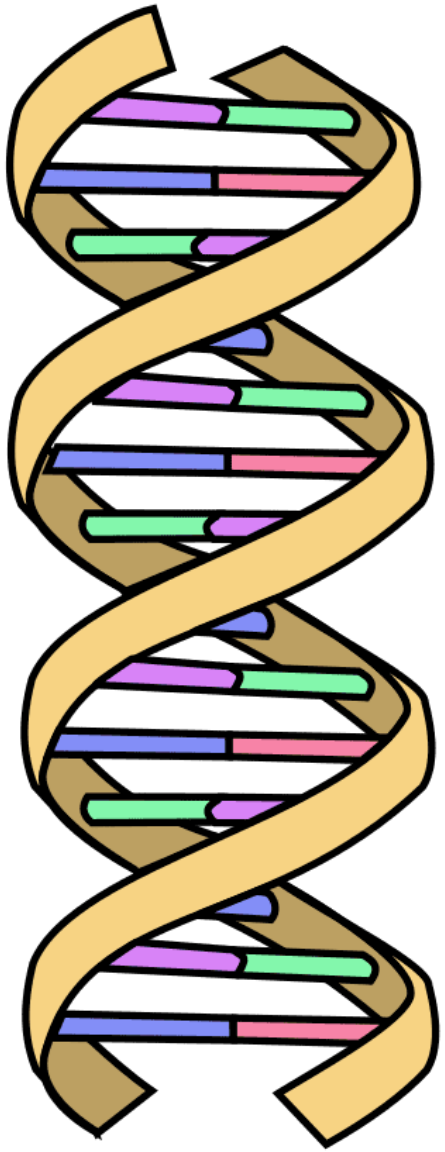
OK Let’s be honest…

- You have to be a special kind of crazy to dive deep into plant nomenclature.
- Most of us are satisfied with the simplest terms to describe a plant.
- BUT we aren’t plant taxonomists (well, most of us at any rate)
- For someone whose job it is to categorize plants, these terms are essential. So is the level of detail brought to all aspects of plant ID.
- It is perfectly OK not to know all this stuff, as long as you can make yourself understood when you want to.

Nomenclature is based o plant taxonomy.

- Which started out as the visual analysis of plant characteristics.
- Catalog and describe all the different organs of the plant and their characteristics.
- But with advances in science, we have now added the molecular side of genetics.

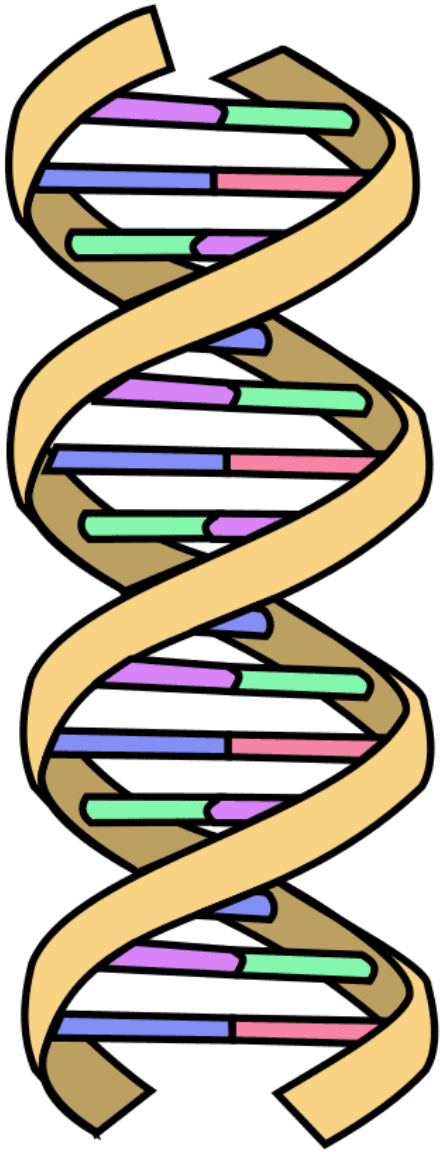




DNA

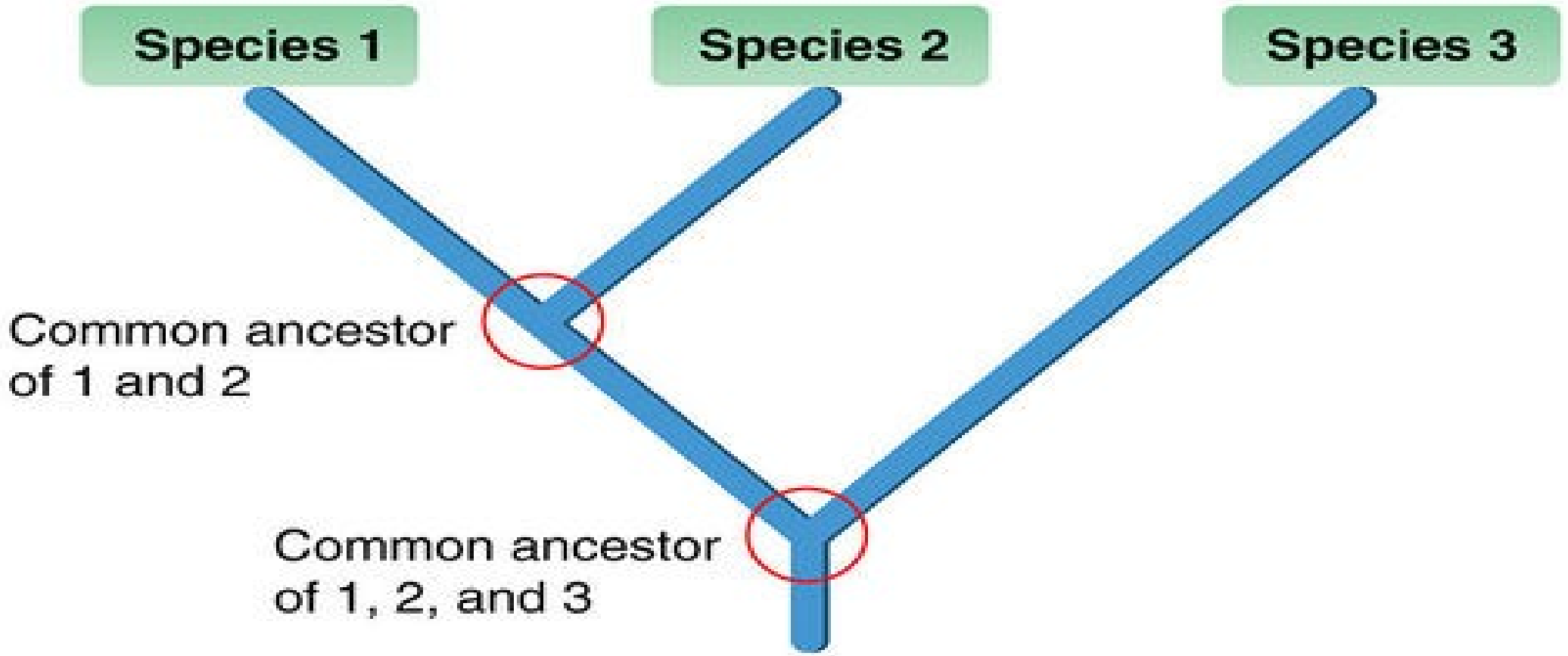
Once you can isolate the DNA of different species of Begonias...

You can begin to compare them for common ancestors, just like Ancestry.com (or 23andMe) does for humans.

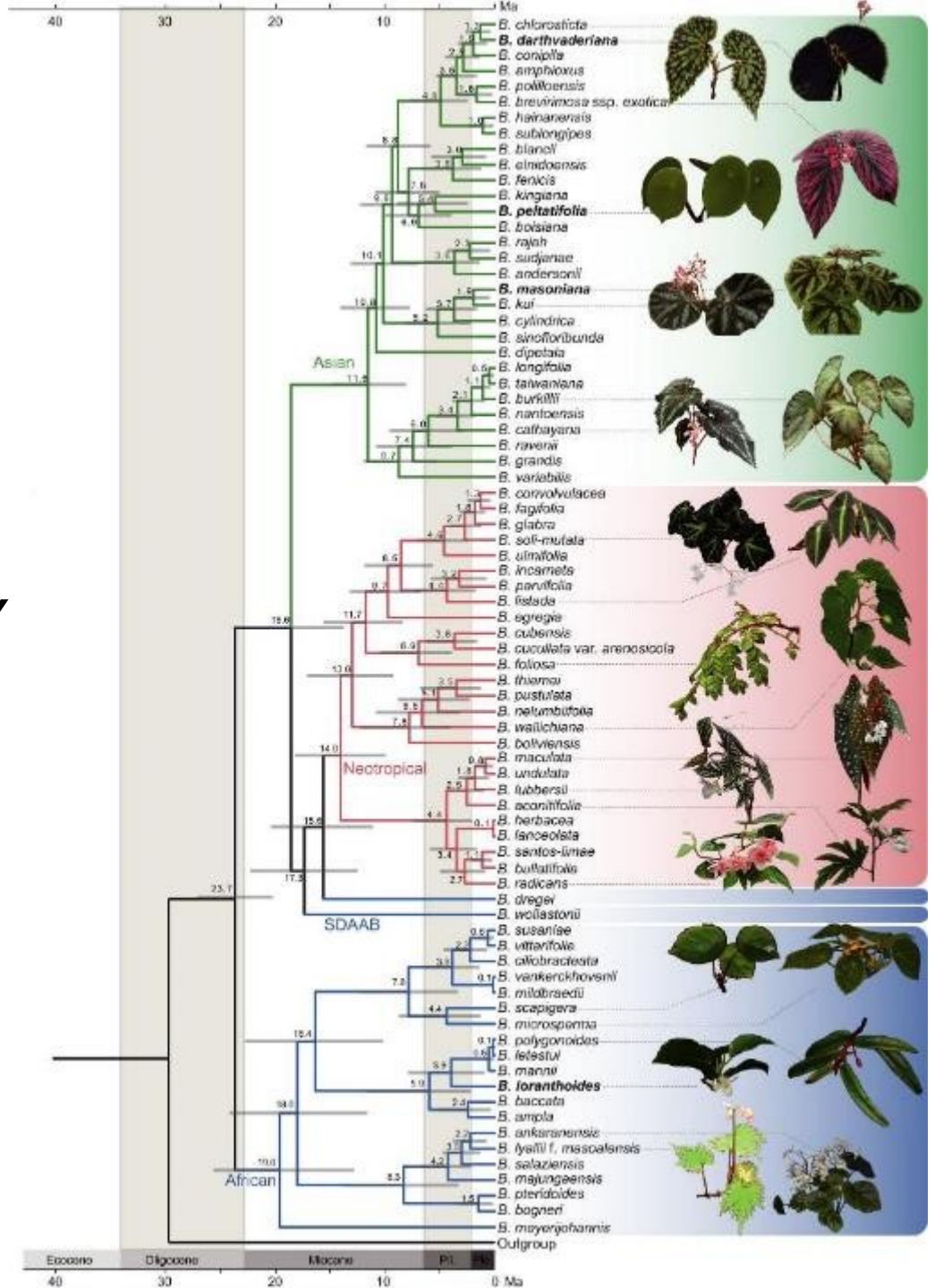


DNA

And that led to phylogenetics



And that gets complicated REALLY fast.



Asia

South America

Africa

TAXON
The Journal of the International Association for Plant Taxonomy

Systematics and Phylogenys

Dividing and conquering the fastest–growing genus: Towards a natural sectional classification of the mega–diverse genus *Begonia* (Begoniaceae)

Peter W. Moonlight ✉, Wisnu H. Ardi, Luzmila Arroyo Padilla, Kuo-Fang Chung, Daniel Fuller, Deden Girmansyah, Ruth Hollands, Adolfo Jara-Muñoz, Ruth Kiew, Wai-Chao Leong, Yan Liu, Adi Mahardika, Lakmini D.K. Marasinghe, Meriel O'Connor, Ching-I Peng, Álvaro J. Pérez, Thamarat Phutthai, Martin Pullan, Sangeeta Rajbhandary, Carlos Reynel, Rosario R. Rubite, Julia Sang, David Scherberich, Yu-Min Shui, Mark C. Tebbitt, Daniel C. Thomas, Hannah P. Wilson, Nura H. Zaini, Mark Hughes **... See fewer authors** ^

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How to manage a GIANT genus?

Cut it up into little pieces

Handout

- For me it is easier to think of the sections of Begoniaceae, in terms of where they came from (what continent).
- Then how big they are, some sections are very large and some only contain 1-2 plants (so far).

That’s how this handout breaks up the information.

Thank
You!